Ontario

Sealable-Joint Cut-off Walls for Groundwater Remediation

"This sheet pile cut-off wall technology now forms the basic product of a University of Waterloo spin-off company, Waterloo Barrier Inc. The new company is focusing on solidifying North American markets for this unique and effective technology. The product line–in terms of steel piling, accessories and available sealants–is being expanded so that the technology can be used under a wide range of site conditions."

Robin Jowett
Manager, Waterloo Barrier Inc.
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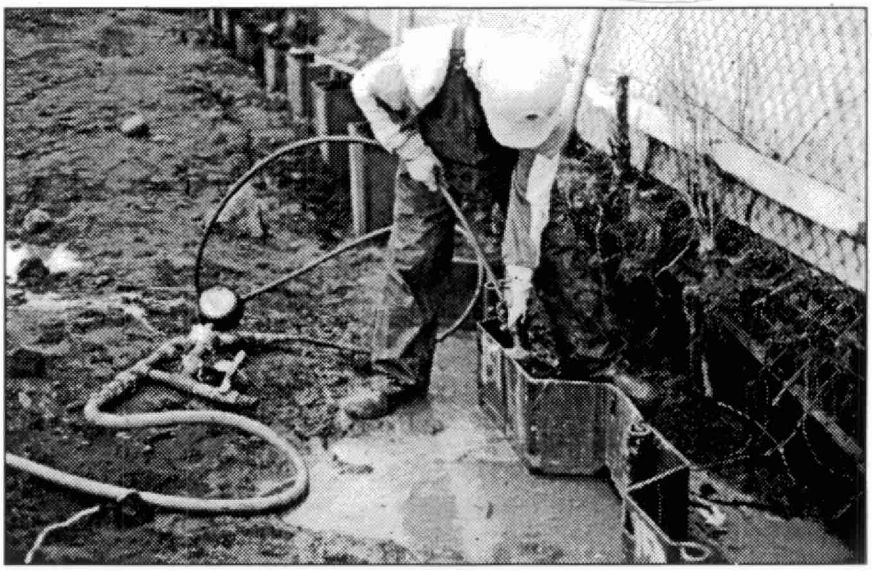

Waterloo Barrier™ installation: November, 1994, Shell Canada Site, Toronto.

THE COMPANY

Waterloo Barrier Inc. (WBI) was established in March, 1994, as a private corporation to commercialize the Sealable-Joint Cut-off Wall — now known as the Waterloo Barrier™ — developed at the University of Waterloo's Centre for Groundwater Research. WBI has obtained exclusive licence to the technology, which is the subject of patents and patents pending, owned by the University of Waterloo.

The manufacture of the special sheet piling has been sublicensed to Canadian Metal Rolling Mills of Cambridge, Ontario. Sealing, quality assurance and quality control aspects of installations are carried out by trained and licensed environmental contractors. C3 Environmental of Breslau, Ontario, provides these services for the Canadian market.

CHALLENGE

In the late 1980's, university researchers required a secure means of isolating portions of an aquifer to conduct studies on the migration, detection and remediation of introduced contaminants. Conventional cut-off wall technologies investigated were unable to provide an adequate degree of hydraulic containment, or were too expensive for use in small-scale structures.

The Waterloo Barrier™ was able to meet both these challenges while providing a high level of confidence in its hydraulic performance..

TECHNOLOGY DESCRIPTION

The Waterloo Barrier™ is a containment wall formed of steel sheet piling with specially designed joints that can be sealed after the piles have been driven into the ground. The interlocking joints between piles are flushed clean with pressurized water, inspected and then sealed. Sealants are temporary or permanent depending on the appliction and can be selected to chemically resist site contaminants.

Potential uses of the Waterloo Barrier™ include:

- as enclosing barriers around hazardous waste sites or landfills;
- as temporary barriers to facilitate various removal or remediation procedures;
- as barriers along waterways to prevent seepage of contaminated groundwater;
- for funnelling or directing of contaminant plumes into subsurface treatment gates, or to enhance the efficiency of pump-and-treat techniques,

RESULTS

A closed, double-walled cell constructed of WZ 75 Waterloo Barrier™ piling was installed to a depth of 15 metres at Canadian Forces Base Borden in Alliston, Ontario. Sealing techniques were tested and the completed cell was subjected to rigorous hydraulic testing. The bulk hydraulic conductivity of the cell was determined to be much less than the standard required by regulatory agencies.

The Waterloo Barrier™ has been installed on a commercial basis at three sites in Canada and twelve in the United States. Canadian projects include a former Shell Canada facility in Toronto; a landfill site in Kitchener, Ontario, where the barrier is used to contain methane gas; and an abandoned mine site in the Yukon. United States clients include the U.S. Air Force, U.S. Army Corps of Engineers and several industrial/manufacturing companies.

The WZ 75 (7.5 millimetres thick) sheet pile has been used to depths of 15 metres at a number of different sites. A new, heavier WEZ 95 (9.5 millimetres thick) sheet pile will be available in early 1997 and can be used to depths of 25 metres or more in reasonable soil conditions.

TECHNOLOGY OPPORTUNITIES

Acceptance of this new technology by regulatory and other government agencies has been very encouraging. The principal market is expected to be in the United States. Containment of contaminated groundwater is being looked upon favourably at U.S. sites where currently available remediation technologies, including pump-and-treat, cannot provide effective ceanup.

Market opportunities are expected to expand with new applications of the Barrier, such as its use as a gas barrier, or in construction dewatering on civil engineering projects.

PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION

The development and demonstration of this technology was partially supported by the Ontario Ministry of the Environment.

Industrial companies located in Ontario may seek ministry/industry services which will help them:

* reduce, reuse and recycle solid waste;
* effectively remediate historic pollution and destroy hazardous contaminants;
* reduce or eliminate liquid effluent and gaseous emissions;
* use energy and water more efficiently.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

FOR FURTHER INFORMATION, PLEASE CONTACT:

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MINISTRY OF THE ENVIRONMENT SERVICES

For information on Ministry of the Environment assistance to industry, please contact the Industry Conservation Branch at (416) 327-1492, Fax (416) 327-1261

For more project profiles and other publications, visit the ministry's website at http://www.ene.gov.on.ca

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